ROTATIONALLY-RESOLVED HIGH-RESOLUTION LASER SPECTROSCOPY OF THE $B\,^2E' \leftarrow X\,^2A_2'$ TRANSITION OF $^{14}NO_3$ RADICAL

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Rotationally-resolved high-resolution fluorescence excitation spectra and the Zeeman effects of the 662 nm band, which is called as the 0-0 band of the $B\,^2E' \leftarrow X\,^2A_2'$ electronic transition, of $^{14}NO_3$ have been observed. [a] Sub-Doppler excitation spectra were measured by crossing a single-mode laser beam perpendicular to a collimated radical beam, which was formed by the heat decomposition of $^{14}N_2O_5$; $^{14}N_2O_5 \rightarrow {}^{14}NO_3$ + $^{14}NO_2$. The typical linewidth was 30 MHz and the absolute wavenumber was calibrated with accuracy 0.0001 cm^{-1} by measurement of the Doppler-free saturation spectrum of iodine molecule and fringe pattern of the stabilized etalon. In the observed spectra, only the rotational line pairs from the $X\,^2A_2'(v'' = 0, K'' = 0, N'' = 1, F_1$ and $F_2)$ levels are assigned, but the other rotational lines were not found yet. In this work, we expanded the measurement of the Zeeman splittings for the other rotational lines, which are predicted their position by using the combination differences calculated from the reported molecular constants. [b] From the observed Zeeman patterns, we have assigned unambiguously several transition lines for the 0-0 band. Additionally, we have measured the rotationally-resolved high-resolution spectra of vibrational excited levels of the $B\,^2E'$ state, which lies 770 cm^{-1} and 948 cm^{-1} above the 0-0 band, and found many tiny rotational lines in these vibronic bands.

[a] K. Tada, W. Kashihara, S. Kasahara, M. Baba, T. Ishiwata, and E. Hirota, *The 68th OSU Symposium*, WJ04 (2013).

[b] R. Fujimori, N. Shimiza, J. Tang, T. Ishiwata, and K. Kawaguchi, *J. Mol. Spectrosc.*, **283**, 10 (2013).